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Of the Bogs, and Loughs of Ireland by Mr. William King, Fellow of the Dublin Society, as it was presented to that Society.

WE live in an *Island* almost infamous for *Bogs*, and yet, I do not remember, that any one has attempted much concerning them; I beleive it may be of use to consider their Origine; their conveniencys, and inconveniencys; and how they may be remedied, or made usefull.

I shall give you my thoughts, and observations on each of these; tho' I am satisfyd, that what I shall be able to say, will be very little, in respect of what would be required, on such an important subject, and so very necessary to the improvement of the Kingdom. As to the *Origine* of *Bogs*, it is to be observed, that there are few places, in our northern world, but have been famous for *Bogs*, as well as this; every barbarous ill-inhabited country has them. I take the *Loca palustris*, or *paludes*, to be the very same we call *Bogs*: the ancient *Galls*, *Germans*, and *Britans* retiring, when beaten, to the *paludes*, is the very same that we have experienced in the *Irish*, and one shall find those places in *Italy*, that were barbarous, such as *Liguria*, were infested with them; and therefore I beleive the true cause of them is want of industry; at least industry may remove, much more prevent them. There are many *Bogs* of late standing in *Ireland*; when *Odonal* and *Tirone* came to the relief of *King'sale*, they wasted the Country, especially as they came thro' *Connaught*, which by the means of the *Earl of Clanrichard*, was generally loyall; and there is a great tract of ground now a *Bog*, that was then plowed land; and there remains the mansion house of my Lord-----in the midst of it: now if want of industry has in our remembrance made one *Bog*; no wonder

der if a Country, famous for lazinefs, as *Ireland* is, abound with them. To fhew you, how want of induftry caufes *Bogs*, you muft remember, that *Ireland* abounds with fprings; that thefe fprings are generally dry, or near dry, in the Summer time and the Grafs, and weeds grow thick about the places where they burft out. In the winter they swell; and run and foften, and loofen all the Earth about them; now that fwerd or fcurf of the Earth, that confifts of the roots of grafs, being lifted up and made fuzzy by the water in the winter, (as I have at the head of fome fprings feen it lift up a foot or two,) is dried in the fpring: and doth not fall together, but wither in a tuft, and new grafs fprings through it; which, the next winter is again lift up, and fo the fpring is more and more ftopt, the fcurf grows thicker and thicker till at firft it make that which we call a *quaking Bog*: and as it grows higher, and dryer, and the grafs roots and other vegetables become more putrid together with the mud and flime of the water it acquires a blacknefs, and grows into that which we call a *turf Bog*. I believe when the vegetables rot the faline particles are generally washed away with the water, as being apt to be diluted in it; but the oily or fulphureal are thofe that chiefly remain, and fwim on the water, and this is that which gives turf its inflammability. To make this appear, 'tis to be obferved that in *Ireland* our higheft mountains are covered with *Bogs*, as well as the plains; becaufe our mountains abound more with fprings then could be imagined: I remember one high mountain, in the north of *Ireland*, has 4 *Loughs* on the fide of it near the top; now no body living on our mountains; and no care being taken to clear the fprings; the whole mountains are overrun with *Bogs*, as I have defcribed.

2, It is to be obferved, that *Ireland* doth abound in moffe more then, I believe, any Kingdom; in fo much that it is very troublefom, being apt to fpoil fruit trees,

and quicksets; I do not remember, that they, who have written of Gardening, or Orchards, mention it, which I am sure they would, had they bin as much troubled with it, as we are; now this moss is of divers kinds, and that which grows in *Bogs* is remarkable, your light spongy *turf* is nothing but a congeries of the threds of this moss, as I have frequently observed, before it be sufficiently rotten, (and then the *turf* looks white and is light,) I have seen it in such quantitys and so tough that the *turf* spades, could not cut it: in the north of *Ireland*, they, by way of joque call it *old wives tow*, and curse her that buried it, when it hinders them in cutting the *turf*, it is not much unlike flax: the *turf*-holes in time grow up with it again, and all the little gutters in *Bogs* are generally filled with it; and truly I chiefly impute the *red*; or *turf Bog*, to it; and from it even the hardened *turf* when broken, is stringy; tho' there plainly appear in it parts of other vegetables: it is observable that both vegetables and Animals have very different forms, when they are kept under and when out of the water; & I am almost (from some observations,) tempted to believe that the seed of this *Bog-moss*, when it falls on dry and parched ground begets the *Heath*: however the moss is so fuzzy and quick growing a vegetable, that it mightily stops the springs, and contributes to thicken the scurf especially in *red Bogs*, where only I remember to have observed it.

3, It is to be observed, that the bottom of *Bogs* is generally a kind of white clay, or rather sandy marle; a little water makes it exceeding soft; and when it is dry it is all dust; and this contributes much to the swelling of the *Bogs*; for the roots of the grass do not stick fast in it; but a little wet loosens them, and the water easily gets in between the surface of the earth and them, and lifts up the surface, as a dropsey doth the skin.

4, 'Tis to be observed, that *Bogs* are generally higher
then

then the land about them, and highest in the middle: the chief springs that cause them being commonly about the middle, from whence they dilate themselves by degrees, as one would blow a bladder; but not always equally, because they sometimes meet with greater obstacles on one side, then on the other: whoever has seen *Bogs*, cannot doubt of this; and besides if you cut a deep trench thro' a *Bog*; you will find the originall spring, & vast quantitys of water will run away, and the *Bog* subside; the *Bog* at *Castle Forbes*, (as I was informed,) subsided 30 foot; I could hardly believe that; but found by computation, that it could not be much less then half of it: I believe, these, and other observations that might be made being laid together, it is hardly to be doubted, but that I have given the true origine of *Bogs*: those hills, that have no springs, have them not; those that have springs, and want culture, constantly have them: where ever they are, there are great springs: the turf generally discovers a vegetable substance: it is light, and impervious to the water; the ground under it is very pervious: and all these are plainly accountable from the causes I have given.

I must confess there are *quaking Bogs*, caused otherwise; when a stream, or spring runs thro' a flat; if the passage be not tended, it fills with weeds in Summer, trees fall a cross it, and dam it up; then, in winter, the water stagnates farther & farther every year, till the whole flat be covered; then there grows up a coarse kind of grass peculiar to these *Bogs*; this grass grows in tufts, and their roots consolidate together, and yearly grow higher, in so much that I have seen of them to the height of a man; the grass rots in winter, and falls on the tufts, and the seed with it, which springs up next year, and so still makes an addition; some times the tops of flags and grass are inter-woven on the surface of the water, and this becomes by degrees thicker, till it ly like a cover on the water; then herbs take root in it, and by a

plexus of the roots it becomes very strong, so as to bear a man ; I have gone on *Bogs* that would rise before and behind, and sink where I stood to a considerable depth; under was clear water, as some of us experienced by falling in with one leg up to the middle, and that by breaking the surface of the earth where we stood : even these in time will grow *red Bogs* ; but may easily be turned into meadow, as I have seen severall times, meerly by clearing a trench to let the water run away.

The inconveniences of these *Bogs* are very great ; a considerable part of the Kingdom being rendered useless by them; they keep People at a distance from one another, and consequently hinder them in their affairs, and weaken them ; for it is certain, that if suppose a 1000 men live on 4 contiguous acres, they can both better assist, and defend one another, then if they lived on 4 not contiguous : and therefore it were good for *Ireland*, the *Bogs* were sunk in the Sea, so their good land were all contiguous ; but it is further observable here, that generally the land, which should be our meadows, and finest evenest plains, are covered with *Bogs* ; this I observed thro all *Connough*, but more especially in *Longford* & likewise in *West Meath* and in the North of *Ireland*. These *Bogs* are a great hindrance in passing from place to place; in as much as that you are forc't to go far about to avoid them, and on this account the roads are very crooked in *Ireland*; or forc't (by vast charges to the country,) through *Bogs*; by these means they are long, and hard to find.

The *Bogs* are a great destruction to Cattle, the cheif commodity of *Ireland*; in the spring time when the Cattle are weak and hungry, the edges of the *Bogs* have commonly grass; and the Cattle venturing in to get it, fall into pits or sloughs; & are either drown'd, or (if they are found,) spoilt in the pulling out; the number of Cattel lost this way is incredible.

4. They are a shelter and refuge to *Torys*, and *Thieves*, who can hardly live without them. The

5, The smel and vapours that are from *Bogs*, are accounted very unwholsome; and the fogs that rise from them are commonly putrid, and stinking: for the rain, that falls on them, will not sink into them; there being hardly any substance of its softness, more impenetrable by water, then turf, and therefore rain-water stands on them, and in their pits; it corrupts there, and is exhaled all by the Sun, very little of it running away, which must of necessity affect the air.

6, They corrupt our water, both as to its colour, and tast; for the colour of the water that stands in the pits, or lys on the surface of the *Bog*, is tinged by the reddish black colour of the turf; and when a shower comes, that makes these pits overflow, the water that runs over tinctures all it meets, and gives both its colour and stink, to a great many of our rivers; as I observed thro' all the North of *Ireland*.

The Natives heretofore had nevertheless some advantage by the woods, and *Bogs*; by them they were preserved from the conquest of the *English*; and I believe it is a little remembrance of this, makes them still build near *Bogs*: it was an advantage then to them to have their country unpassable, and the fewer strangers came near them, they lived the easier; for they had no inns, every house where you came, was your inn; and you said no more, but put off your broges & sate down by the fire; & since the natural *Irish* hate to mend high ways, and will frequently shut them up, and change them, (being unwilling strangers should come and burthen them;) Tho' they are very inconvenient to us, yet they are of some use; for most of *Ireland* have their firing from from them; Turf is accounted a tolerable sweet fire, and we having very impolitickly destroyed our wood, and not as yet found stone coal, save in few places, we could hardly live without some *Bogs*: I have seen turf charc'd,

it serves to work iron, and as I have bin informed, will serve to make it in a bloomery or iron-work : turf charc-ed I reckon the sweetest and wholsomest fire, that can be; fitter for a Chamber, and consumptive People, then either wood, stone-coal or char-coal.

I know not if it will be worth the observing, that a *Turf-Bog* preserves things strangely, a Corps will ly intire in one, for severall years; I have seen a piece of leather pretty fresh dug out of a *Turf-Bog*, that had never in the memory of man been dug before; Butter has bin found, that had lain above 20 years, and tho' not fit to be eaten, yet served well enough to greaze wool: Trees are found found, and intire in them, and those Birch, or Alder that are very subject to rot. The Trees are supposed by the ignorant vulgar to have lyen there ever since the Flood, but the truth is, they fell on the surface of the Earth; and the *Bog*, as I shewed in the beginning of this discours, swelling by degrees, at last covered them; and being of an oſly vegetable substance, it, like a balsam, preserves them; the Trees burn very well and serve for torches in the night: I have seen them uſd as Lights in catching of Salmon: I have seen of the Trees half sunk into the *Bogs*, and not quite covered.

I am in the last place to shew you how these inconveniencys may be remedied, and our *Bogs* made usefull; 'Tis certain the thing is possible; it has bin done in *England, France, and Germany*; and if we had the same industry we may promise our selves the same success. I know men commonly distinguish between *Bogs* that have no fall to carry away the water from them; and those that have; and determine the last drainable, but not the first: but I must profess I never observed one *Bog* without a fall sufficient to drain it, nor do I believe there is any. But the great and weighty objection against them is the charge; and it is commonly thought, that it will cost much more then would purchase an equal scope of
good

good ground; an acre of good land in most parts of *Ireland* is about 4^s per annum, and the purchase 14, or 15, years; & therefore three pound will purchase an acre of good land; and it is very doubtfull with most, whether that sum will reduce a *Bog*: this reasoning passes current, and is the great obstacle and impediment of this work; but if these things following were done and considered, I verily believe it would be removed.

1, An act of Parliament should be made, such as was for the building of *London*; that who did not in such a time, make some progress in draining their *Bogs*, should part with them to others that would, & allow a passage to them thro' their lands: rather then Gentlemen would let others come into their bounds, they would purchase their *Bogs* at double the rate, as they doe patches of land within them.

2dly 'Tis to be considered, that *quaking Bogs*, tho' land be never so cheap; never fail to be worth the draining; one trench drains many acres; and when dry, it is generally meadow, or the best grazing ground.

3dly Every *red Bog* has about it a deep marshy sloughy ground, which they call the *bounds* of the *Bogs*, and which never fails to be worth the draining: one deep trench round the *Bog*, doth it; by this Cattle are kept out of the *Bog*, and all the bounds of the *Bog* turned into meadow as I have frequently seen.

4thly As to *red Bogs*, I remember one of 60 acres, which a Gentleman drained; the land about it was 4^s, 9^d per acre; it was not worth any thing, but rather pernicious to his Cattle; he reduced it to good grazing ground worth 3^s an acre, for 25*l*; which is less then 3 years purchase.

5thly Gentlemen ought to consider, that what they lay out this way, goeth by degrees, and they are not sensible of it; it goeth among the Tenants, and enables them to pay their rent the better: 'tis a work of charity, and

employs hands, and conduces to both the ornament & generall profit of the Kingdom; and therefore they ought to dispense with it, tho' somewhat dear.

6thly That even *red Bogs* might be made fit for grazing, at a much cheaper rate, then they have bin hitherto, if these rules were observed: 1 a deep trench must be made round the *Bog*, as before; this reduces all the bounds of the *Bogs*, goes a great way to dry the *Bog* it self; and hinders at least its growing: it serves likewise as a common sink, into which all your drains vent themselves.

7thly in the *Bog*, observe which way the little *Sloughs* run; be sure to cut their drains a cross them; one drain so cut doth more, then 3 or 4 long ways; as I saw by Experience.

3dly the first drains on the *Bog*, ought not to be above 2 or 3 foot deep or wide; deep trenches ought by no means to be attempted at first; for the *Bog* is so soft, that they will not stand, but fill up again; neither can any body stand well in them to cut them deep: but when the surface of the *Bog* is cut in little trenches suppose at 20, or 40 perch, distance, it is hardly credible how much it will be dried: I remember such a little trench, drawn thro' a *Bog*, that was very wet, dried it, so that Cattle could graze on it all Summer; and the *Bog* subsided, for an hundred yards, on each side, so visibly, that one would have believed it a naturall valley.

4thly a year or 2 after the little trenches are made, & the *Bog* a little dry; they are (at least every other trench as one sees occasion is,) to be made six foot deep and six wide, if the softness of the *Bog* will permit; if not, then six foot wide and 4 deep is enough; and this will certainly make the *Bog* usefull for grazing: in a year or 2 after, you may attempt to cut one or two of the trenches to the bottom of the *Bog*; for till that be done, I do not reckon the *Bog* secured.

5thly A Gentleman ought to oblige all his Tenants to
cut

cut the turf in his trenches, and likewise cut his own so, for this is just so much gain, and prevents that pitting of *Bogs*, that renders them deformed & pernicious to Cattle.

6thly Where a *Bog* is pitted, he is to cut a passage from one pit to the next for the water, and so make a communication to the common drain, and if his pits be once dried there will grow grass or heath at the bottom, fit for grasing; and they will be shelter for Cattle in storms.

7thly When his *Bog* is dried, it is thereby made better turf: and then he is to set out a part of it for that use, and to oblige them to cut it clear away; and the *Bog* being removed, the bottom will make good meddow: as I have seen in the County of *Longford*.

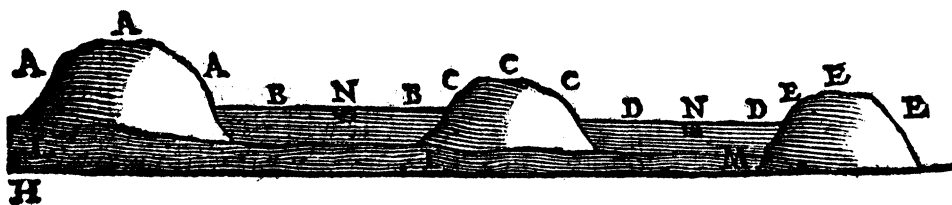
8thly if he would improve his *Bog* any further then grasing; he must do it either by cutting off the surface of the *Bog* and burning it, or else by bringing Earth and laying on it: Sanding or rather indeed Gravelling is a great improvement in this country; the land so manured will bring corn 12 or 14 years, and would bring grass, if People did not Plow it so long, as to consume all the substance of it, and destroy the roots of the grass, which are not to be recovered in many years, and then they say gravelling is bad for grass; but the contrary is apparent, especially in *Bogs*. I have observed by the way side where those ways pass thro' *Bogs*, if a little Earth hath fallen on the *Bog*, as some times there doth fall a little of that which they bring to mend the high way, it has turned the *Bog* into a green sod, with a very fine scutch grass on it: and I doubt not but the same charges, that Sands or Gravels land, would reduce a dried *Bog*; even to be arable; but this requires time and experience, which I doubt not but will find out many compendious and easy methods of performing these things, more then we can think of.

Twere naturall to add some thing concerning *Loughs*,
and

and *Turloughs* : the naturall improvement of *Loughs*, or lakes, is first to drain them as low as we can ; and then turn the residue of the water into fish-ponds, by planting a few Trees about them, and ordering them thus they may be made both usefull, and ornamentall.

As to those places we call *Turloughs*, *quasi Terreni lacus*, or *land-lakes* ; they answer the name very well, being lakes one part of the year of considerable depth ; and very smooth fields the rest : if my memory dos not fail me, Doctor *Brown* describes exactly the like in *Hungary*, or else in the way between *Vienna* & *Venice* : there are in these, holes out of which the water riseth in winter, and goeth away towards Summer, many hundred acres being drowned by them ; and those the most pleasant, and profitable land in the country : the soil is commonly a marl, which, by its stiffness, hinders the water from turning it into a *Bog* ; and immediatly when the water is gone, it hardens, so that you ride thro' an even grassy field ; these, if they could be drained would be fit for any use ; would make meddow ; or bear any grain, but especially rape, which is very profitable. They are chiefly in *Connaught* ; and their cause is obvious enough, it is a stony hilly Countrey ; the hills have cavitys in them, through which the water passes : it is common to have a rivulet sink on one side of a hill, and rise a mile, or half a mile, from the place : the brooks are generally dry in Summer ; the water that should be in them, sinking between the Rocks, and running under ground ; in so much as that in some places where they are overflowed in winter, they are forced in Summer to send their Cattle many miles for water. There is one place on a hill near *Tuam* between two of these *Turloughs*, where there is a hole the superstitious People call the *Divels Mill* ; and make fables concerning it : if you stand by this place, you will hear a great noise, like that of a water under a bridge : where there is a flood in winter, one of the *Turloughs* overflows, and vents it
self

self into the hole; and the noise doth, in all likelyhood, proceed from a subterraneous stream; which in Summer has room enough to vent all its waters; but in winter, when rains fall, the passages between the Rocks cannot vent the water, and therefore it regurgitates; and covers the flats.



Let GH be a plain parallel to the horizon; let AAA be a hill; BNB a flat; CCC another hill; DND another flat; and EEE another hill: let LIM be a subterraneous rivulet, that runs under the surface of the Earth; at M let there be a narrow passage, which can only vent such a quantity of water; the head of the river above L is suppose higher then the flat BNB or DND ; the current suppose is swollen with rain, and brings more water to M , then can pass: it is plain the rest must fill the passage LI and at last burst out at NN , the holes suppose in the flats, and cover the flats; and by this means the whole Country in the winter seems full of Lakes; and again in Summer, when the passage M is big enough for the water of the rivulet, the water subsides and falls thro' the holes NN into the subterranean passages and in a little time leaves the flats dry till the next year.

These *Turloughs* are hard to drain; often they are encircled with hills, and then 'tis not to be expected: often they have a vent by which they send out a considerable stream; and then it is only making that passage as low, as the bottom of the flat, and that will prevent the over-

flowing : it sometimes happens that the flats are as low as the neighbouring rivulets, & in probability are filled; and then it is not only necessary to make the passage from the flat to the rivulet, but likewise to sink the rivulet which is very troublesome ; commonly the passage to be cut is Rocky : having never seen any of them cut, I can only say thus much;

1, Before they begin, a surveyor ought to take the level of the flat with the place into which the vent is to be made, and if the place be lower the vent is possible.

2, A good computation ought to be made, what the vent will cost? how much land it will drain? what the land is worth *per acre*, as it is? and what it will yield when drained? and by that he will see, whether it be worth the while to attempt it.

3, The holes *NN* ought to be opened, and digged, and fenced about, that grafs, and other dirt, may not get into them; for by this means the water will in its ordinary course, get sooner away; and lastly they are to be eaten very bare towards the end of Summer, that as little grafs as is possible may be spoilt by the water.